

Abstract -TRIZ Future 2006

# The Usage of TRIZ to improve material efficiency and energy efficiency of industrial production processes - Ideas for a conceptual framework

Jürgen Jantschgi<sup>1</sup>, Dr. Johannes Fresner<sup>2</sup>

## Abstract

Cleaner Production is an organized approach to minimize industrial waste and emissions by increasing the efficiency of the use of materials and energy. It is propagated especially by UNIDO and UNEP as an approach to identify preventive measures, such as good housekeeping, technological changes, change of raw materials, internal and external recycling as a preventive approach to environmental protection by cutting on waste and emissions from industrial activities. Case studies conducted by the authors in the last 10 years demonstrate, that in a number of cases water consumption of industries from the surface treatment sector as well as from food processing could be reduced by 30 to 90%, auxiliary materials consumption could be reduced by 30 to 50%, and energy consumption of processes could be reduced by 15 to 25%. All these measures were actually economically beneficial for the companies, most of these measures paid back in less than one year.

Although Cleaner Production has been around for more than 15 years, until now only encyclopedic checklists are available to assist in the identification of improvement options. Still focused expert knowledge is necessary to locate the potential areas for improvement.

TRIZ offers very strong tools for process improvement. The authors have found from their projects and research, that especially the concept of the Ideal Final Result, and the Laws of Evolution form a conceptual framework which can aid effectively in the identification of improvement options in a systematic way. The approach used will be demonstrated in the presentation and the full paper along with examples from different sectors.

## Keywords:

cleaner production, material efficiency, waste minimisation, zero emission, energy efficiency, ideal final result, laws of evolution

## References

- Fresner, J., Setting up effective environmental management systems based on the concept of cleaner production: Cases from small and medium sized enterprises, in R. Hillary: „ISO 14001 Case Studies and Practical Experiences“, October 2000, ISBN 1 874719276
- Fresner, J., J. Sage, P. Wolf, A benchmarking of 50 Austrian companies from the galvanizing and painting sector: current implementation of cleaner production options and active environmental management, Proceedings of the 8<sup>th</sup> European Roundtable on Cleaner Production, Cork, October 2002
- Fresner, J., G. Engelhardt, Experiences with integrated management systems for two small companies in Austria, Journal of Cleaner Production 12 (2004) 623-631
- Fresner, J., P. Wolf, Ecoprofit by preventive environmental management, ASEM Workshop on EU/Asia S&T Cooperation on Clean Technologies, Hanoi, 3-6 November 2004
- Fresner, J., Galvanik ohne Abfall – ein unerreichbarer Wunschtraum?, Österreichische Chemiezeitschrift, 106. Jahrgang, 5/2005, p 6-8
- Fresner, J., C. Brunner, G. Gwehenberger, M. Planasch, K. Taferner, H. Schnitzer, Zero Emission Retrofitting in the Austrian Galvanising Industry, IPSD Maribor, 2005
- Jantschgi, J., J. Fresner, Linking TRIZ & Sustainability (Training and Consulting Models), 4<sup>th</sup> European TRIZ Symposium, Frankfurt/Main, June 30<sup>th</sup> – July 1<sup>st</sup>, 2005
- Jantschgi, J., Project Examples to start and foster Dissemination of TRIZ in Austria, Conference “Development of TRIZ: achievements, problems, outlook”, The International TRIZ Association, St.Petersburg, July 2<sup>nd</sup> -8<sup>th</sup>, 2005
- Jantschgi, J., Training Course SUPPORT - Sustainable Innovation Tools - Fostering methodical Product- and Process- Development by Combining TRIZ-Tools and Sustainable Development, ETRIA's 4th TRIZ Future Conference, Florence, November 3<sup>rd</sup> – 5<sup>th</sup>, 2004
- Jantschgi, J., L. Shub, TRIZ – Innovativer Irrgarten der Werkzeuge?, in C. Gundlach, H. Naehler, Innovation mit TRIZ, Konzepte, Werkzeuge, Praxisanwendungen, Symposium Verlag, Duesseldorf, 2006, ISBN 3 936608741
- Malzer, C., J. Bärnthaler, J. Fresner, M. Möller, Innovation senkt Energiekosten, 9. Symposium Energieinnovation, 15. – 17. 2. 2006, TU-Graz

---

<sup>1</sup> University of Leoben, Industrial Liaison Department, Leoben, Austria, juergen.jantschgi@mu-leoben.at

<sup>2</sup> STENUM GmbH, Graz, Austria, j.fresner@stenum.at, www.stenum.at

